

Notes on some genera and species of Encyrtidae (Hym., Chalcidoidea), with special reference to Dalman's types

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During the course of my work on British Chalcidoidea I have found some problems relating to the interpretation of certain genera and species of Encyrtidae. Much work on this family has recently been done in Europe (e.g., Ferrière, 1953, 1955, 1956; Erdős and Nowicky, 1955; Erdős, 1955—1957; Hoffer, 1952—1957) and still continues. In spite of this certain genera and species (chiefly of earlier date) have not been properly understood owing to the fact that authors have generally been unable to examine the types concerned. As I have had the privilege of examining many of the types of species described by Dalman, Westwood, Walker, Mayr, and Thomson, I feel that an attempt to clarify some of the more outstanding misconceptions will be of interest to other workers.

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1. Genera of Encyrtidae not correctly interpreted:*Ectroma* Westwood

Ectroma Westwood, 1833, *Phil. Mag.* (series 3), 3, p. 344.

Metallon Walker, 1848, *List Hym. Ins. Brit. Mus. Part II.* — *Chalcidites*, p. 219 (syn. n.).

Pezobius Förster, 1860, *Verh. naturh. Ver. Preuss. Rheinl.*, 17, p. 129 (syn. n.).

Mayr (1875, p. 766) placed *Aglyptus* Förster, 1856 in synonymy with *Ectroma* Westwood, and this view has been followed by later authors (Thomson, 1875; Mercet, 1921; Ferrière, 1953). Investigation of the respective type species, however, shows that this synonymy is incorrect. The type species of *Ectroma* is *fulvescens* Westwood, 1833, the genus being monobasic; and that of *Aglyptus* is *Encyrtus lindus* Walker, 1837 (by original designation, this also being the only included species). The error appears to have arisen because of the later action of Westwood (1839, *Synopsis Gen. Brit. Ins.*, p. 72), who placed "E.[upelmus] rufus Dalm." in his genus *Ectroma*, evidently under the impression that *rufus* was conspecific with *fulvescens* Westwood, 1833. Not being satisfied about this view, I examined the respective types of *Eupelmus rufus* Dalman, 1820, and of *Ectroma fulvescens*, Westwood, 1833, with the following results.

Ectroma fulvescens Westwood:

In Westwood's collection I can find only one specimen so named; it bears two labels, (1) "Cb. 33 Aug.", (2) "ECTROMA fulvescens Westw Phil Mag", both in Westwood's handwriting. It agrees with Westwood's description and has the right locality and date; and although the head and antennae are broken off, it clearly belongs to the genus *Pezobius* Förster, and is a male. I now designate this specimen as lectotype of *Ectroma fulvescens* Westwood.

Eupelmus rufus Dalman: originally described by Dalman (1820, p. 383) as "*Eupelmus rufus*". Dalman described *rufus* from "Specimen a Dom. ZETTERSTEDT in Scania lectum, Julii 10." In his collection there is a single specimen under the name *rufus*, agreeing well with the description, and clearly the holotype; it is a female, bearing a tiny blue ticket and also a label bearing what appears to be the figure "91". The holotype is not congeneric with the type of *Ectroma fulvescens* Westwood, but belongs to the genus *Aglyptus* Förster.

It should be noted that Mayr (1875, p. 769) created further confusion by placing *Encyrtus fulvescens* Walker, 1838, in the

genus *Anusia* Förster, 1856. Walker (1838, *Ent. Mag.*, 5, p. 115) describes this species as *Encyrtus (Ectroma) fulvescens* under the impression that it was Westwood's *Ectroma fulvescens* of 1833; but this description of the species does not apply well to the true *fulvescens*. Moreover, there are discrepancies between his brief specific description and his sectional (or subgeneric) diagnosis immediately preceding it. For instance, he says in his specific description "antennae —", thus implying that the antennae were missing, whereas his sectional diagnosis describes the antennae in detail. I believe that his description is a composite one, made partly from his own supposed *fulvescens*, but supplemented from some other source by details (e.g. the antennal structure) not present in his own material. I suggest also, that his supposed *Ectroma fulvescens* (description of the species) was in fact something quite different. Now Mayr (1875, p. 769) evidently based his action in placing *Encyrtus fulvescens* Walker in *Anusia* on the fact that Walker sent him a specimen of *Anusia nasicornis* Förster, named as "*Ectroma fulvescens*". Besides alluding to the misidentified Walker specimen, Mayr also (*loc. cit.*, p. 770) refers to the figure of *Ectroma fulvescens* in Walker's *Notes on Chalcidiae* part 5, 1872, p. 74, and to that of the same species drawn by Haliday in *The Entomologist* (vol. 1, plate E, figs. 2a and 3), remarking that these figures (especially that of 1872) did not correspond with his own interpretation of *fulvescens* (based on the specimen sent to him by Walker). The misidentification by Walker would explain this. My views on the identity of the species just discussed may therefore be summarized as follows:

Anusia nasicornis Förster, 1860 (= *Encyrtus fulvescens* Walker, 1838 (*ex parte*), = *Anusia fulvescens* Walker, Mayr, 1875 (nec *Ectroma fulvescens* Westwood, 1833)).

The identity of the genus *Metallon* has been the subject of much controversy. Mayr (1875, p. 679) admitted that he did not know the genus, but suggested from his interpretation of Walker's description that the genus was one of those having a 5-segmented antennal funicle. Thomson (1875, pp. 118 and 169) regarded it as being the same as his genus *Trechnites*, which also has a 5-segmented funicle. Mercet (1921, p. 436) accepted Thomson's view. Ferrière (1953, p. 9) rightly concluded that *Metallon* Walker was the same as *Pezobius* Förster, this view being followed by Erdős and Novicky (1955). The latter authors, however, perpetuated an error by stating the type-species of *Metallon* to be "*Encyrtus aeneiventris* Walker", instead of *Metallon acacallis* Walker. Erdős (1955, pp. 189—190) discussed the identity of *Metallon*, and agreed

with the view that it is the same as *Pezobius* Förster and further concluded that the type-species of *Metallon, acacallis* Walker 1848, was the same as *Encyrtus aeneiventris* Walker, 1837. Hoffer (1957, pp. 41—53) follows Erdös in his interpretation of *Metallon* and of the two species *acacallis* and *aeneiventris*.

The whole problem depends upon the identity of Walker's two species, *aeneiventris* and *acacallis*, and as I have been able to resolve the question by a study of the types of these two species, I shall now discuss them in detail.

Metallon acacallis Walker:

In the British Museum (Nat. Hist.) one Walker specimen stands under that name; the antennae are broken off, but the specimen otherwise agrees with the description, and I designate it as lectotype of *acacallis*. The lectotype is card-pointed, and bears the green-edged British Museum Type label. I have no doubt that it is a male of *Ectroma fulvescens* Westwood. Hence the genus *Metallon* Walker is identical with *Ectroma* Westwood.

Erdös (1955, p. 190) concluded that *Pezobius* Förster, 1860 was identical with *Metallon* Walker. Unfortunately the type of *polychromus* Förster, 1860, the type-species of the genus, is lost; Förster (1860, p. 129) when actually describing the species, stated "Von diesen interessanten Thierchen habe ich nur ein einziges Exemplar vor Augen gehabt, das später durch Zufall verloren ging." However, such details as I am able to gather from Förster's description convince me that the view stated by Erdös is correct. I regard *Pezobius polychromus* Förster as being probably the same species as *Ectroma fulvescens* Westwood (and possibly the male of it).

I have mentioned above that Erdös (1955, p. 190) concluded that *Metallon acacallis* Walker was a synonym of *Encyrtus aeneiventris* Walker, 1837. This view is not correct, but in order to explain this it is necessary to discuss the type of *aeneiventris*. Walker (1837, Ent. Mag., p. 447) described *Encyrtus aeneiventris* from Scotland: "Found on heathy hills, in the Isle of Bute, by Mr. Haliday" (*ibid.*, p. 448). I therefore looked for the types in Haliday's collection, and found there one specimen, bearing a pink lozenge-shaped ticket and also a pink label reading "aeneiventris" in Haliday's handwriting. The pink lozenge was Haliday's method of indicating specimens originating from Scotland, so that the above specimen clearly fits the locality requirements. The specimen also fits the description (except that the hinder half of the abdomen is brown, but this may be due to fading), and I confidently designate it as lectotype of *Encyrtus aeneiventris*.

Walker. It is a female, and belongs, not to *Metallon* i.e., *Ectroma*, but to the genus *Sceptrophorus* Förster (= *Microterys* Thomson, = *Encyrtus* Mercet, 1921, *nec* Latreille, 1809). In Mercet's revised key to "Encyrtus" (1921, pp. 705—706) it runs to couplet 2" and to *micropterus* Mercet. It agrees with the description of *micropterus* except that it has the antennal flagellum fuscous with only the fifth and sixth funicle segments a little paler beneath, the genae are bordered with fuscous, and the mesosternal plate is black.

It may be remarked that Walker himself placed *aeneiventris* immediately after *barbarus* Dalman and *zarina* Walker (1837, *Ent. Mag.*, 4, p. 447). Both of these species also belong to the genus *Sceptrophorus* Förster [comb. n.].

The misidentification of *aeneiventris* which has resulted in its being placed incorrectly in *Ericydinus* by Mayr (1875, p. 765), in *Pezobius* by Mercet (1921, p. 172), and in *Metallon* by Erdös (1955, p. 190) and Hoffer (1957, p. 46), can be traced back to the work of Mayr, and is due to the fact that authors have been obliged to rely on a poor description by Walker.

A summary of the new synonymy is given as follows:

Ectroma fulvescens Westwood

- Ectroma fulvescens* Westwood, 1833 (♀)
- Metallon acacallis* Walker, 1848, syn. n. (♂)
- Pezobius polychromus* Förster, 1860, syn. n. (?♂)
- Ericydinus aeneiventris* Mayr, 1875 (♀) (*nec Encyrtus aeneiventris* Walker, 1837)
- Pezobius aeneiventris* Mercet, 1921 (♂♀) (*nec Encyrtus aeneiventris* Walker, 1837)
- Metallon aeneiventre* Erdös, 1955; Hoffer, 1957 (♂♀). (*nec Encyrtus aeneiventris* Walker, 1837).

Sceptrophorus aeneiventris (Walker), comb. n.

- Encyrtus aenei-ventris* Walker, 1937 (♀).

As a result of the new synonymy, certain other species now must be recombined into *Ectroma* Westwood. These are:

- Ectroma reinhardi* (Mayr), comb. n.
 (= *Ericydinus Reinhardi* Mayr, 1875)
- Ectroma insigne* (Mercet), comb. n.
 (= *Pezobius insignis* Mercet, 1921)
- Ectroma arenarium* (Erdös), comb. n.
 (= *Metallon arenarium* Erdös, 1955)
- Ectroma albiclavatum* (Hoffer), comb. n.
 (= *Metallon albiclavatum* Hoffer, 1957)

Aglyptus Förster

Aglyptus Förster, 1856, *Hym. Studien*, Heft 2, p. 33.
Ectroma auctorum (nec Westwood, 1833).

As already remarked, the type species of *Aglyptus* is *Encyrtus lindus* Walker, 1837 (*Ent. Mag.*, 4, p. 451). The typical form described by Walker was macropterous, but he also mentioned a "Var. β" which was brachypterous ("alae nullae"). Unfortunately I cannot at present find a specimen agreeing with the description of the typical form in Walker's collection (British Museum (Nat. Hist.)); the only one standing under the name is a brachypterous female which is evidently his Var. β. However, Walker's description (and particularly his mention of the colour of the antennae, and of the wing-markings) convince me that in describing *lindus* he had a macropterous female of *rufus* Dalman before him. Specimens named as *lindus* in the collection of J. C. Dale (Hope Department, University Museum, Oxford) are also *rufus*, and were doubtless named by Walker, with whom Dale was in constant touch. This view, of the identity of *rufus* Dalman and *lindus* Walker, has also been accepted by all subsequent authors. I therefore take it to be correct.

Epiencyrtus Ashmead

Epiencyrtus Ashmead, 1900, *Proc. U.S. Nat. Mus.*, 22, pp. 340, 396.

One of Dalman's species (*Encyrtus brevicornis* Dalman, 1820) has been placed by various authors in *Epiencyrtus*, whilst another (*E. melanacis* Dalman, 1820) has also been included in that genus by some workers. I consider that *Epiencyrtus* has not been correctly understood by European authors, so that the question must be discussed in some detail.

Ashmead (1900, p. 396) in proposing *Epiencyrtus* as a new genus, stated that "The types of the genus are *Encyrtus thyreodontis* Ashmead and *Enc. melanacis* Dalman." There must be one species only as the type of any genus, so that Ashmead's statement is equivocal. However, Gahan and Fagan (1923, p. 54) stated the type of *Epiencyrtus* to be *Encyrtus thyreodontis* Ashmead, and this may be taken as a valid designation. In any case, all subsequent authors have accepted *thyreodontis* as the type species.

Mercet (1921, p. 291) accepted *Epiencyrtus* as a good genus, at the same time referring to it the European species *Encyrtus brevicornis* Dalman. He also remarks (p. 290) on the fact that Ashmead had originally included *melanacis* Dalman in *Epiencyrtus*, although as he says, that species had certainly not been

seen by Ashmead. Mercet (quite correctly) refers *melanacis* to the genus *Tyndarichus* Howard (of which he had seen a cotype of the type species, *navae* Howard, and was therefore in a position to interpret correctly). However, as he had not seen authenticated material of *thyreodontis* Ashmead, he was not quite sure of the identity of the genus *Epiencyrtus*, admitting (p. 290) the possibility that it might be identical with *Tyndarichus*, although he gives reasons for supposing this to be unlikely. Hellén (1949, pp. 47–48), placed both *melanacis* Dalman and *brevicornis* Dalman in *Epiencyrtus*. Ferrière (1953, p. 20) retained *brevicornis* Dalman in *Epiencyrtus*, following Mercet (1921).

Ashmead's description of *Epiencyrtus* (1900, pp. 340, 346, 396) left me doubtful of the identity of his genus, as there is more than one European genus which would fit the diagnosis. However, Dr. Burks at my request kindly sent me for examination two syntypes of *E. thyreodontis* Ashmead, the type species. These show clearly that *Epiencyrtus* differs from *Tyndarichus* (which it much resembles in facies) in having no triangular expansion on the submarginal vein of the forewing, the antennal scape not expanded, and in some other characters. On the other hand, it is also different from what Mercet (1921, p. 290) calls *Epiencyrtus*, because it has the body conspicuously metallic, the head, mesoscutum and scutellum more shiny and with different sculpture, the antennae different in form with the scape not strongly expanded and the clava very strongly obliquely truncate at the apex.

Now, as Mercet referred *Encyrtus brevicornis* Dalman to a genus which he erroneously called *Epiencyrtus*, it remains to determine whether he interpreted Dalman's species correctly. This is in fact the case.

Dalman's collection contains only one specimen standing as *brevicornis*; it is a female, and bears a label marked "10". As it agrees quite well with the description, I designate it as lectotype of *Encyrtus brevicornis* Dalman, 1820. Mercet's redescription (1921, pp. 291–292) and figure (loc. cit., fig. 123) apply well to the lectotype.

Therefore *brevicornis* clearly does not belong to *Epiencyrtus*, and as it does not appear to fit into any other existing genus, I now describe a new one for its reception:

Amaurilyma, gen. nov.

Belongs to the tribe Microteryni, subtribe Microteryna of Erdös and Novicky (1955).

F e m a l e. — Body black, or with a hardly perceptible metallic tinge; fronto-vertex, mesoscutum, and scutellum relatively dull,

with very fine dense sculpture (almost as in *Metaphycus*). Head not strongly transverse, hardly as broad as thorax; fronto-vertex rather more horizontal than in *Syrphophagus* and forming (in profile a slight angle with the face, nearly as broad as an eye, (as seen from above) with some small scattered punctures; occipital edge sharp; eyes rather thickly clothed with very short hairs; malar space equal to the lesser diameter of an eye; mandibles with three teeth. Antennae inserted distinctly below ventral edge of eyes; scape very strongly laminately compressed and medially expanded, as in *Metaphycus*; combined length of pedicellus and flagellum hardly equal to breadth of head; pedicellus much longer than the first funicle segment; flagellum strongly clavate; funicle 6-segmented, with the segments progressively increasing in length and breadth, the first slightly, the sixth strongly transverse; clava not much shorter than the funicle, 3-segmented with the divisions between its segments oblique as seen in profile, slightly obliquely truncate at apex.

Thorax short, strongly convex dorsally. Pronotum (viewed from above) almost hidden by the strongly convex mesoscutum. Mesoscutum without notaulices, dull, with numerous small piliferous punctures. Axillae contiguous. Scutellum strongly convex (as in *Trichomasthus*), its sculpture and clothing like that of the mesoscutum (but it is duller with hardly perceptible punctures). Propodeum as in *Sceptrophorus* Förster (= *Microterys* Thoms.) Wings immaculate. Forewing long and broad, far surpassing the apex of the gaster; costal cell rather narrow; submarginal vein without a triangular expansion, and bearing about 10—13 long bristles; marginal vein at least twice as long as broad; postmarginal subequal to marginal; stigmal slightly longer than marginal; linea calva complete. Spur of mid tibia shorter than the first tarsal segment (but as long as its dorsal side).

Gaster subtriangular, about as long and as broad as the thorax; cercal plaques situated at about the middle of its length; terebra hardly visible from above; last sternite nearly reaching apex of gaster.

Male. — Differs from the ♀ as follows: fronto-vertex slightly broader than an eye; antennae inserted slightly below ventral edge of eyes; scape slightly compressed but hardly expanded (though short, hardly twice as long as broad); combined length of pedicellus and flagellum about equal to that of head and thorax; pedicellus shorter than first funicle segment; flagellum stouter than pedicellus, subfiliform, slightly compressed; funicle segments longer than broad; clava triarticulate, but the divisions between its segments not strongly marked; gaster narrower than the thorax.

Type species: *Encyrtus brevicornis* Dalman, 1820.

Resembles *Sceptrophorus* Förster (= *Microterys* Thoms.), *Syrphophagus* Ashmead, and *Aphidencyrtus* Ashmead in the majority of characters, but differs from these in its less transverse head and more horizontal fronto-vertex, black body with hardly perceptible metallic tinge, strongly convex mesoscutum and scutellum, and the dense sculpture of the latter parts, which renders them very dull. From *Sceptrophorus* it also differs in its non-maculate forewings; and from *Syrphophagus* and *Aphidencyrtus* in the compressed and expanded scape of the female, and in the short-haired flagellum of the male. The flagellum of the female is shorter and more clavate with shorter funicle segments and a larger clava, than in nearly all the species of the above genera. The antennae of the female are very like those of some species of *Paraphaenodiscus* Girault, but *Amaurilyma* does not resemble that genus in other respects.

Encyrtus Gabestus Walker, 1838 (*Ent. Mag.*, 5, p. 116) is a synonym of *brevicornis* Dalman (syn. n.). It was described from Ireland: "Found at Holywood, near Belfast, by Mr. Haliday." I have located three specimens, one in the British Museum (Nat. Hist.) and two in Haliday's collection (Dublin), named as *gabestus*. The specimen (a male) in the British Museum is certainly one of Haliday's, but it agrees better with Walker's description of Var. β. The two specimens in Haliday's collection are a female and a male mounted upon the same card; the pin carrying the card has its head covered with green sealing-wax (one of Haliday's methods of indicating specimens of Irish origin), and it also bears a green label on which is written "gabestu" in Haliday's handwriting. Both specimens agree well with Walker's description, the female perhaps better than the male, which has the hind tarsi rather paler than might be expected. In spite of this, I designate the male as lectotype of *gabestus*, because Walker's sectional diagnosis of the male (1838, p. 115) is more complete, while on p. 116 he refers to the female with a query ["Fem.?"]. The lectotype, and the other two specimens, of *gabestus* are all the same as *brevicornis* Dalman.

2. *Dalman species of Encyrtidae not well understood:*

Metaphycus punctipes (Dalman)

Encyrtus punctipes Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, 1820, p. 154.

There has been some doubt regarding the identity of this species, which I am not able to settle satisfactorily in spite of having seen Dalman's syntypic series.

Mayr (1875, p. 697) does not refer to Dalman's own specimens, although from his remarks prefacing the list of Dalman species on page 676 one might presume that he had seen the types of *punctipes*, which is included in this list. His redescription is, of course, inadequate by modern standards for recognition of the species.

Timberlake (1916, p. 589) included *punctipes* in his key to the species of *Aphycus s. lat.*, but later in the same paper (p. 612) remarked "No authentic specimens of this species have been studied, and its position in the synoptic table was determined solely from the descriptions of Dalman and Mayr." Mercet (1921, p. 216) redescribed a species of *Metaphycus*, under the name of *punctipes* (Dalman), which is evidently the same as *melanostomatus* (Timberlake) 1916 (which Mercet quotes as a synonym of his supposed *punctipes*.) So far as I am aware, Mercet's view has not since been questioned.

The series now standing under the name *punctipes* in Dalman's collection comprises 11 specimens. Nos. 1 to 6 are mounted on separate pins; Nos. 7 and 9 and 10, 11 are mounted upon two separate cards. Of these, only Nos. 1 to 3 have any labels. No. 1 has no dark spots on the legs, and cannot therefore be the type (but it may be Dalman's Var. β , described in his Addenda, 1820, p. 371). No. 2 unfortunately lacks the head and antennae, one forewing, and some of the legs; the remains do not agree particularly well with the description. I gather the impression that this may have been a female of *melanostomatus* (Timberlake), but in the absence of the head and antennae, one cannot be sure. No. 3 is a fine female of *melanostomatus*; it cannot be the type, as Dalman (1820, p. 154) emphatically says "Caput . . . subtus cum ore album . . .", while in this specimen the genae and mouth-edge are heavily marked with black, and other discrepancies are evident; I think this is the specimen mentioned by Dalman in his later Addenda (1820, p. 371) as follows: "Alterum quoque specimen misit Dom. ZETTERSTEDT olim descripto omnino simile, sed antennarum scapus etiam margine superiore albus et caput utrinque versus os macula nigra notatum, ore mandibulisque vero albis." Nos. 4 to 11 are, I believe, all referable to one species (but a different one from No. 1 or Nos. 2 and 3) having the ocelli in a very acute-angled triangle, the scape not very strongly expanded (about three times as long as broad, not counting the radicle) and pale at the base, and the dark spots of the legs very indistinct. I think none of these can be the type, as Dalman (p. 154) says "scapus . . . summo apice albo . . .", and his figure of the female antenna (1820, Tab. viii, fig. 60) confirms this statement, and further shows the scape as very strongly expanded; moreover, in

the above specimens the dark marks of the legs are not as distinct as seems to be implied by the description.

Consequently I am obliged to regard *punctipes* Dalman as an uncertain species, though certainly belonging to the genus *Metaphycus* Mercet. It seems clear, both from Dalman's description, and from the specimens in his collection, that it cannot be the same as *melanostomatus* Timberlake.

Aphycooides clavellatus (Dalman)

Encyrtus clavellatus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, 1820, p. 355.

This species has never been properly understood. Thomson (1875, p. 165) placed it in his genus *Microterys* (now regarded as comprising several genera). Mayr (1875) treated it as belonging to *Encyrtus* (s. lat.). Ashmead (1900, p. 396) stated that it belonged to his new genus *Pseudencyrtus* (but it is clear that he did not know the true identity of *clavellatus*). More recently, Ferrière (1953, p. 21) has followed Ashmead in placing it in *Pseudencyrtus*.

There is only one specimen in Dalman's collection standing as *clavellatus*; it is a female, bearing a tiny red ticket and a label upon which is written something which might be "WG". The specimen agrees quite well with Dalman's description, and I now designate it as lectotype of *clavellatus*. It belongs to the genus *Aphycooides* Mercet (1921).

Ferrière (1953 a, p. 4) described a species which he named *Aphycooides merceti*; I have seen the type of this species in the British Museum (Nat. Hist.), and feel sure it is conspecific with *clavellatus* Dalman. It was described from a series of both sexes reared from the Coccid *Physokermes abietis* (Geoffr.).

The following species are also synonyms of *clavellatus* Dalman, as shown by their respective types in the British Museum (Nat. Hist.):

Encyrtus Corybas Walker, 1837, *Ent. Mag.*, 5, p. 40. Represented by two Walker specimens, both female, and both conspecific with the type of *clavellatus*.

Encyrtus Liriope Walker, 1837, *Ent. Mag.*, 5, p. 40. "July; pine-trees, near London." Under the name *liriope* there stands a series of six specimens, all evidently Walker specimens; but only two of these are labelled as *liriope*, the others bearing different specific names. I designate as lectotype of *liriope* the first specimen, a female, which bears two printed labels reading "ENCYRTUS Liriope" and "England" respectively.

Encyrtus Ilithyia Walker, 1838, *ibid.*, p. 418. One Walker

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specimen, a female, which agrees with the description; I take it as type.

Encyrtus Mysus Walker, 1838, *ibid.*, p. 424. "July, September; on pine trees, near London." One Walker specimen, a male, which I designate as type.

Encyrtus Alycoeus Walker, 1848, *List Hym. Ins. Brit. Mus. Part II. — Chalcidites*, pp. 135, 220. The only Walker specimen so named which I can find is one now standing under the series of *Cercobelus jugaeus*; it is a female bearing a printed label "Alycoeus" and I regard it as the type.

The synonymy may therefore be summarized as follows:

Aphycooides clavellatus (Dalman), comb. n.

Encyrtus clavellatus Dalman, 1820.

Encyrtus corybas Walker, 1837, syn. n.

Encyrtus liriope Walker, 1837, syn. n.

Encyrtus ilithyia Walker, 1838, syn. n.

Encyrtus mysus Walker, 1838, syn. n.

Encyrtus alycoeus Walker, 1848, syn. n.

Aphycooides merceti Ferrière, 1953, syn. n.

Pseudencyrtus misellus (Dalman)

Encyrtus misellus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 171.

This was placed as a synonym of *Microterys* (= *Syrphophagus*) *aeruginosus* (Dalman) by Thomson (1875, p. 164). Mayr, however, made it (1875, p. 723) a synonym of *clavellatus* Dalman. The species does not seem to have been noticed subsequently.

In Dalman's collection a single specimen stand under the name *misellus*; it is a male, and bears a label with a printed number "21.". Since it agrees very well with Dalman's description, I now designate it as lectotype of *misellus*. It has nothing to do with either *aeruginosus* Dalm. or *clavellatus* Dalm., its true position being in the genus *Pseudencyrtus* Ashmead (1900).

The type species of *Pseudencyrtus* is *Encyrtus cecidomyiae* Howard, 1885 (an American species), by original designation. In order to be quite sure of the identity of this genus, I sent an inquiry to Dr. Burks of the United States National Museum, who very kindly sent me authenticated specimens of *Ps. cecidomyiae* (Howard) for examination. Having compared the type of *misellus* Dalman with these, I can state definitely that the two species are congeneric; in fact, *cecidomyiae* is extremely close structurally to *misellus*, but not I think conspecific.

Pseudencyrtus misellus is a common and widespread species in Europe, and a parasite of *Rhabdophaga salicis* (Schr.) (Dipt., Cecidomyiidae) on willows. It is the species hitherto known by the name "clavellatus Dalman" or (in some cases) "salicis-strobili Linn.". I have shown that *clavellatus* belongs to a different genus, while *salicis-strobili* L. is now usually placed in *Superprionomitus* Mercet.

I should mention that *Encyrtus tennes* Walker, 1837 (*Ent. Mag.*, 5, p. 47) is a synonym of *misellus* Dalman, according to Walker's types in the British Museum (Nat. Hist.) and specimens elsewhere named as *tennes* by Walker. *Encyrtus sitalces* Walker, 1837 (*Ent. Mag.*, 5, p. 47) is extremely close to *misellus*, but has the body more green, the head less transverse, and the ocelli in a less obtuse triangle; I have seen forms which tend to bridge the gap between the two, however, and it is possible that *sitalces* is merely a form of *misellus*. Another point which should be mentioned is that *sitalces* Walker has been placed as a synonym of *salicis-strobili* L. (which is now referred to the genus *Superprionomitus*). It is uncertain at the moment what Linné's *salicis-strobili* actually is, but if it really belongs to the genus *Superprionomitus*, then it clearly cannot be the same as *sitalces* Walker.

We therefore have the following synonymy:

Pseudencyrtus misellus (Dalman) 1820, comb. n.

Encyrtus tennes Walker, 1837, syn. n.

?*Encyrtus sitalces* Walker, 1837.

Pseudencyrtus clavellatus auctt. (nec *Encyrtus clavellatus* Dalman, 1820).

Possibly the genus *Syrphophagus* may have to be united with *Pseudencyrtus* eventually. One species, *S. idmon* (Walker), which Mercet (1921, under the name of *Microterys claviger* Thomson) associated with *aeruginosus* and others which are now placed in *Syrphophagus*, seems to form a link between these two genera.

For convenience I may give the probable synonymy of this species:

Syrphophagus idmon (Walker), comb. n.

Encyrtus Idmon Walker, 1848, p. 223.

Encyrtus Idya Walker, 1848, p. 224.

Microterys claviger Thomson, 1875, p. 164.

Syrphophagus fuscipes (Dalman)

Encyrtus fuscipes Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*,
p. 365.

Thomson (1875, p. 165) treated this as a good species, and placed it in *Microterys*. Mayr (1875, p. 723) placed it, with a query, as a possible synonym of *Encyrtus clavellatus* Dalman. Ferrière (1953, p. 21) included it in the genus *Pseudencyrtus* Ashmead.

In Dalman's collection a single specimen stands under the name *fuscipes*. It is a male, bearing a label on which is written a number "111". It agrees quite well with Dalman's description, and I designate it as lectotype of *fuscipes*. It does not belong to the genus *Pseudencyrtus*, as the occiput is quite sharp, and the wing-venation differs. In its general characters it agrees with certain species of *Syrphophagus*, and would I think be best placed in that genus. As far as I can ascertain, there are no other species which could be synonyms of *fuscipes*. It must now be known as *Syrphophagus fuscipes* (Dalman), comb. n.

Syrphophagus herbidus (Dalman)

Encyrtus herbidus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*,
p. 356.

Placed by Thomson (1875, p. 164) in *Microterys*, and regarded by him as a distinct species. Mayr (1875, p. 710, including it in his key to the species of *Encyrtus* (s. lat.), remarked: "Vielleicht Varietät der vorigen Art". i.e., *mitratus* Dalman. Since then the species *mitratus* has been assigned (in my view correctly) to the genus *Prionomitus* Mayr, and *herbidus* has also been removed to that genus, following the suggestion of Mayr that it might be a form of *mitratus*. I shall show that this view is incorrect.

In Dalman's collection, two specimens stand under the name *herbidus*, both being females, and in my opinion conspecific. I designate as lectotype of *herbidus* the second specimen, which bears a tiny crimson ticket, and a label having two symbols which I cannot interpret but appearing like those on the label borne by the type of *clavellatus* (see above). It agrees well with the description except that the coxae of the middle legs are dark (but this I think is not a serious discrepancy).

The lectotype has no connexion with the genus *Prionomitus*, having a different venation and abdominal structure amongst other characters. On a balance of characters I think it would be best placed in *Syrphophagus* Ashmead (comb. n.). In the hyaline

wings, not broadly expanded scape, and general habitus, the female agrees better with the species of *Syrphophagus* than with those of *Microterys*. It is true that the male of *herbidus* has rather short hairs on the antennal flagellum, whereas other species of *Syrphophagus* tend to have long hairs; but we know that both types of vestiture may occur within what is undoubtedly a single genus, (e.g., in males of *Bothriothorax*).

The following species are synonyms of *herbidus* Dalman, according to my investigations on their respective types:

Encyrtus Ariantes Walker, 1837, *Ent. Mag.*, 5, p. 44. The type-locality is in Ireland ("Found near Belfast, by Mr. Haliday"). The only specimen named as *ariantes* which I can find is one standing under that name in Walker's collection; it is, however, certainly a Haliday specimen, and as it also agrees with the description, I designate it as lectotype. It is a female *herbidus*, and bears a printed label reading "Ariantes".

Encyrtus Scythis Walker, 1838, *Ent. Mag.*, 5, p. 118. Type-localities: "near London; Isle of Wight; Forest of Fontainbleau. Found at Holywood, near Belfast, by Mr. Haliday." [The latter locality, i.e., Holywood, is in Ireland]. In the British Museum collection, 5 Walker specimens stand under the name *scythis*; but all disagree with Walker's description of the typical form (though they may be one of his varieties), so that I cannot accept any as type. As Walker gives one Irish locality and quotes Haliday as the captor, I looked for a possible type in Haliday's collection; in fact the collection contains two specimens mounted upon the same card, and bearing a green label »*scythis*». The green label indicates Irish origin, and the specimens are mounted in Haliday's style. They agree so well with Walker's description that I feel sure it was drawn up from them. They are a female and a male of *herbidus* Dalman; I designate the female as lectotype of *Encyrtus scythis* Walker.

Encyrtus Elbasus Walker, 1837, *Ent. Mag.*, 5, p. 45, may be a synonym of *herbidus* Dalman. There is actually one Walker specimen in the British Museum labelled as having stood under the name of *elbasus*, and this is a female *herbidus*; but I do not feel sure whether it really should be taken as lectotype.

Bothriothorax paradoxus (Dalman)

Encyrtus paradoxus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 163.

Mayr (1875, p. 756) transferred *paradoxus* to the genus *Bothriothorax* Ratzeburg, but recognized it as a species distinct from *Encyrtus clavicornis* Dalman, 1820, which he also removed to

Bothriothorax. Thomson (1875, p. 134) likewise placed both species in *Bothriothorax*, but made *paradoxus* a synonym of *clavicornis*.

I have not seen Dalman's type of *paradoxus*, but am sure of the identity of the species from Dalman's description and his figure of the male antenna (1820, Tab. VIII, fig. 59), both of which are very good. Mayr saw the type, but mistook the sex, regarding it as female.

As *paradoxus* has been supposed by most authors (following Thomson's synonymy) to be the male of *clavicornis*, the name has been sunk, as *clavicornis* has page priority.

However, as I shall show below, *clavicornis* is a species quite distinct from *paradoxus*, the latter therefore being a valid name.

Encyrtus Nicippe Walker, 1839 (*Ann. Mag. nat. Hist.*, 4, p. 234) is a synonym of *paradoxus* Dalman. Walker's original record was "September, Northumberland, found by Dr. Greville." There is a single specimen in Greville's collection (Royal Scottish Museum, Edinburgh) which is named as *nicippe*; I now designate it as lectotype. It is a female *Bothriothorax paradoxus*. Walker described it as male, but his description applies quite well to this female, and he obviously mistook its sex. The type is numbered "Greville 1936—50. 286", and bears a label in Greville's handwriting "Encyrtus Nicippe WK. n. sp. Fide WK. Edinb."

Bothriothorax clavicornis (Dalman)

Encyrtus clavicornis Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 161.

Six specimens stand under the name *clavicornis* in Dalman's collection. Of these, Nos. 1, 2 and 3 stand as the typical form; Nos. 4 and 5 as "Var. β "; No. 6 as "Var. γ ". The series is a mixture of three different species.

Nos. 4, 5 and 6 do not agree with the description of the typical form, as might be expected as they are indicated as varieties. Of the others, No. 1 and No. 3 both agree pretty well; but No. 1 has the femora rather too dark, and is pinned through the scutellum, which is therefore not clearly visible, whereas Dalman (p. 161) refers in some detail to the structure of the scutellum. No. 3 is pinned through the right-hand side of the mesoscutum, leaving the scutellum wholly visible; while the femora are less darkened.

Hence I designate as lectotype of *clavicornis* the third specimen; this bears a small yellowish ticket, and another upon which is written the figure "8". In my opinion the lectotype is conspecific with *conformis* Thomson, 1875, which thus falls as a synonym of

clavicornis. *B. conformis* Thomson has been redescribed by Ferrière (1956, p. 58); I have myself seen the syntypes.

I might mention that the fourth and fifth specimens of Dalman's series of *clavicornis*, i.e., those standing as Var. β , agree with his description of this variety, and are females of *paradoxus*.

Encyrtus Eupales Walker, 1837, *Ent. Mag.*, 5, p. 51, is also probably a synonym of *clavicornis*. In the British Museum (Nat. Hist.), two Walker specimens stand under the name *eupales*, and I think, both are conspecific. However, I have not yet chosen a lectotype.

The synonymy of the two preceding species may therefore be summarised as follows:

Bothriothorax paradoxus (Dalman)

Encyrtus paradoxus Dalman, 1820.

Encyrtus clavicornis var. β , Dalman, 1820.

Encyrtus Nicippe Walker, 1839, syn. n.

Bothriothorax paradoxus Mayr, 1875.

Bothriothorax clavicornis Thomson, 1875, et auett. plur. (nec Dalman, 1820).

Bothriothorax clavicornis (Dalman)

Encyrtus clavicornis Dalman, 1820.

?*Encyrtus Eupales* Walker, 1837.

Bothriothorax clavicornis Mayr, 1875.

Bothriothorax conformis Thomson, 1875, syn. n.

Two other species belonging to *Bothriothorax* should be mentioned here. They are *Encyrtus serratellus* Dalman, 1820, and *Encyrtus Aralius* Walker (1837, *Ent. Mag.*, 4, p. 457). A short discussion of their respective types is necessary:

1. *Encyrtus serratellus* Dalman. Redescribed and placed in *Bothriothorax* by Thomson (1875, p. 135); also redescribed and figured by Ferrière (1956, pp. 59—60, fig. 3). Dalman's collection contains one male standing as *serratellus*, and this agrees with Ferrière's interpretation of the species. I designate this male as lectotype; it bears a tiny crimson triangular ticket, also a label with the number "25."

2. *Encyrtus Aralius* Walker. The series of five Walker specimens under this name in the British Museum is very mixed, comprising representatives of three different genera. However, the specimen which appears to fit the description best is the second in the series, a male *Bothriothorax* bearing a blue label reading "*aralius*". The fifth of the series, similarly labelled, is conspecific with the second. The Haliday collection (Dublin) also contains a

specimen labelled *aralius*, and this is a male conspecific with the above from Walker's collection. The balance of evidence thus suggests that *aralius* is really a *Bothriothorax*, and I designate as lectotype the second specimen of Walker's series mentioned above. *B. aralius* is very similar to *serratellus*, but I have noted certain differences (see my key below) and think it is better to regard them as distinct species.

The following key will I hope aid in the identification of the species of *Bothriothorax*:

1. Postero-lateral angles of propodeum (viewed dorsally) toothed. Either the proximal third of the forewing (basad to the linea calva and below the submarginal vein) is bare, or else the eyes are clothed with hairs which are as long as the diameter of an ocellus.

♂: funicle segments short, the first at most 1.5 times as long as broad, the distal ones transverse; clava as long as (*trichops*) or longer than (*paradoxus*) the entire funicle, solid, slightly curved, and truncate at the apex.

♀: antennal scape much expanded distally, its anterior edge with a broad thin flange in the upper third of half 2

- Postero-lateral angles of propodeum rounded. Proximal third of forewing (basad to the linea calva) partly hairy. Eyes with extremely short, inconspicuous hairs.

♂: funicle segments longer, the first at least twice as long as broad, the distal ones not transverse; clava not or hardly longer than funicle segments 5+6, oblong or trapezoidal.

♀: antennal scape less expanded distally, the flange on its anterior edge narrower and less conspicuous (and usually shorter). 3

2. Proximal third of wing bare. Eyes with extremely short hairs.

♂: antennal clava longer than the whole funicle. ♀: antennal funicle with decumbent hairs; hairs of fronto-vertex very short and inconspicuous *paradoxus* (Dalm.)
Proximal third of wing with several long hairs. Eyes clothed with conspicuous hairs whose length is equal to the diameter of an ocellus.

♂: antennal clava equal in length to the funicle.

♀: antennal funicle with outstanding hairs; hairs of fronto-vertex long and vertical *trichops* Thoms.

3. Males 4

- Females 6

4. Antenna: pedicellus much longer than broad and almost as long as the first funicle segment; funicle with very short almost decumbent hairs, its sixth segment not or slightly longer than broad; clava trapezoidal, strongly obliquely truncate at apex *clavicornis* (Dalm.)

- Antenna: pedicellus slightly longer than broad and much shorter than the first funicle segment; funicle with whorls of long hairs, its sixth

segment obviously longer than broad; clava oblong, not or only slightly truncate at apex 5

5. Mesopleuron wholly smooth, or at most alutaceous along its posterior edge; metapleuron extremely narrow, Antenna (see Ferrière, 1956, fig. 3); funicle segments, or at least some of them, with two slight nodes on their dorsal edge. Punctures of mesoscutum better defined and umbilicate *serratellus* (Dalm.)

— Posterior part (one-quarter to one-third) of mesopleuron alutaceous and dull. Metapleuron broader. Antenna: funicle segments without dorsal nodes. Punctures of mesoscutum weak and shallow
aralius (Walker)

6. Antenna: clava strongly obliquely truncate, the length of the truncation equal to or longer than rest of lower side of the clava 7

— Antenna: clava less strongly truncate, the length of the truncation shorter than the rest of the lower side of the clava 9

7. Spaces between the punctures of the fronto-vertex alutaceous, duller. Mesopleuron: posterior part (one-quarter to one-third) alutaceous and dull.
 Punctures of mesoscutum shallow and poorly-defined
aralius (Walk.)

— Spaces between punctures of fronto-vertex mainly smooth and shiny. Mesopleuron wholly smooth, or at most slightly alutaceous along its posterior margin. Punctures of mesoscutum deeper and well-defined 8

8. Antenna: first funicle segment at least 1.5 times as long as broad, sixth only slightly transverse; funicle with very short hairs, the length of those on the dorsal side of the proximal segments being about half the breadth of the segments themselves *clavicornis* (Dalm.)

— Antenna: first funicle segment not or hardly longer than broad, the sixth strongly transverse; funicle with longer hairs, the length of the hairs on the dorsal side of the proximal segments about equal to the breadth of the segments themselves *serratellus* (Dalm.)

9. Antenna: clava about equal in length to the four preceding funicle segments *ghesquieri* Ferrière

— Antenna: clava as long as the five preceding funicle segments
wichmani Ferrière

3. The Types of some other Dalman species, with notes on synonymy

Syrphophagus aeruginosus (Dalman)

Encyrtus aeruginosus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*,
 p. 170.

Transferred by Thomson (1875, p. 163) to his new genus *Microterys*, and retained in that genus by Mercet (1921, p. 363). Ferrière (1953, p. 34) placed it in *Syrphophagus* Ashmead.

Having received for examination some authenticated material of the American *Syrphophagus mesograptae* Ashmead, the type species of that genus, I thought it worth while to compare it with the types of *Encyrtus aeruginosus* Dalman. This showed that the two species are certainly congeneric, and in fact very closely resemble each other.

Dalman's series of *aeruginosus* comprises 10 specimens, all females, and all probably conspecific (the tenth specimen is rather peculiar, but probably the same as the rest) — I designate as lectotype the third specimen, which agrees best with the description; Dalman (p. 170) says "Scutellum cupreo-aeneum, nitidum, — (in nostris acu laceratum.)"; and in the lectotype the pin carrying the specimen passes through the base of the scutellum, leaving the rest visible. The lectotype bears a small gold ticket, and a label with a printed number "12."

The following species are synonyms of *aeruginosus*, as shown by their types in the British Museum (Nat. Hist.) or elsewhere:

Encyrtus Sosius Walker, 1837, *Ent. Mag.*, 5, p. 39. One Walker specimen, a female, stands under this name, and agrees well enough with the description to be regarded as lectotype. It bears the green-edged circular British Museum Type label.

Encyrtus Pertiades Walker, 1837, *ibid.*, 5, p. 42. I can find only one female so labelled, standing in the British Museum collection under this name; I designate it as lectotype. It bears a printed label "Pertiades".

Encyrtus Thinaeus Walker, 1837, *ibid.*, 5, p. 42. Walker states that this species was "Found near Belfast, by Mr. Haliday." Therefore the types might be either in Haliday's own collection (National Museum, Dublin, Éire) or in that of Walker. As a matter of fact, there is one female in each of these collections. In Walker's collection a specimen stands under the name *pertiades*, but bears a printed label "Thinaeus"; I recognise it as a Haliday specimen by the style of mounting, but it bears no indication of Irish origin. In Haliday's collection there is one specimen, bearing a green label reading "thinoeus". The green label is one of Haliday's methods of indicating Irish origin, and as the specimen in his collection seems to agree well with the description of *thinaeus*, I designate it as lectotype.

Encyrtus Dercilus Walker, 1837, *ibid.*, 5, p. 43. Two Walker specimens labelled as *dercilus* now stand amongst the series of *Encyrtus liriope*; both are female. Of these, the first, which bears a printed label reading "Dercilus", agrees best with the description, and I designate it as lectotype.

Encyrtus Meges Walker, 1846, *Ann. Mag. nat. Hist.*, p. 178.
One Walker specimen, a female, stands under this name, and I take it as lectotype.

To summarise the synonymy:

Syrphophagus aeruginosus (Dalman)

Encyrtus aeruginosus Dalman, 1820.
Encyrtus Sosius Walker, 1837, syn. n.
Encyrtus Pertades Walker, 1837, syn. n.
Encyrtus Thinaeus Walker, 1837, syn. n.
Encyrtus Dercilus Walker, 1837, syn. n.
Encyrtus Meges Walker, 1846, syn. n.

Copidosoma flagellare (Dalman)

Encyrtus flagellaris Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*,
p. 350.

Transferred to the genus *Copidosoma* Ratzeburg by Mayr (1875). Thomson (1875) placed it in his new genus *Litomastix* but he used *Copidosoma* as a name for a species-group within *Litomastix*, a procedure which is impossible by present-day rules, as *Copidosoma* is the earlier of the two names. At present, authorities disagree as to whether *Litomastix* is a distinct genus or only a subgenus of *Copidosoma*. Mayr's generic placing of *flagellaris* has been accepted by all subsequent authors.

In Dalman's collection there is now one female standing as *flagellaris*, and bearing a label on which is written a sign "V.". It agrees perfectly with the description, and must be the holotype. It is certainly a *Copidosoma*, agreeing with Mayr's redescription (1875).

Mercet's redescription of *flagellaris* (1921, p. 482) does not agree with Dalman's type, so I give the following notes on the latter:

Head mainly, pronotum, mesoscutum, scutellum [broken by the pin, but most of it actually visible], and mesopleuron, green; a violet transverse band from eye to eye across upper end of scrobes; genae mainly coppery; propodeum, metapleuron, and gaster, greenish-bronze; prepectus bronzy, its hinder half whitish. Mandibles yellowish. Antennal scape and pedicellus blackish with a green lustre; extreme base of scape whitish, apical third of pedicellus yellowish; flagellum brown. Tegulae yellowish, their outer half fuscous. Legs yellow; mid coxa mainly brownish; hind coxa green; tips of tarsi brown; a slight infuscation on the middle of the hind femur and hind tibia. Length of body about 1.7 mm.

Head slightly narrower than thorax, about twice as broad as long; breadth of fronto-vertex where narrowest 20.5, breadth of an eye as seen from above 13.5; ocelli in a triangle of about 100° , each posterior ocellus separated by slightly less than its own greater diameter from the eye-margin, and about its greater diameter distant from occiput. Eye: length to breadth as $27.5 : 18.5$. Malar space equal to the breadth of an eye. Antenna: scape (length 41) slightly shorter than the combined lengths of funicle segments 1—4; pedicellus (length 9.5) about 2.5 times as long as broad; first funicle segment slightly shorter than the pedicellus (8.5) and hardly three times as long as broad; sixth funicle segment hardly 1.5 times as long as broad; clava equal in length (32) to the four preceding funicle segments. Length of whole flagellum 97.

Mesoscutum with sharp sculpture, rather coarser posteriorly. The sculpture consists of elongate areoles, most of them about twice as long as broad, so that the surface has a longitudinal striate-reticulate character. Scutellum relatively dull, wholly reticulate, the sculpture strong but finer than that of the mesoscutum, and consisting of areoles most of which are not longer than broad (a few at the base of the scutellum slightly longer than broad). Axillae relatively dull, more finely reticulate than the scutellum.

Gaster triangular, moderately compressed, almost as long as but slightly narrower than the thorax; exserted part of ovipositor (as seen in profile) slightly shorter than spur of mid tibia.

Mayr (1875, p. 737) gives *Encyrtus Anceus* Walker, 1837, as a synonym of *flagellaris*, on the basis of a specimen named as *anceus* sent to him by Walker. I examined the syntypes of *anceus* in order to check this synonymy: in the British Museum (Nat. Hist.) collection two females which originally stood as *anceus* in (Dalman). They are both conspecific, but the first agrees better with Walker's description, so I designate and have labelled it as lectotype of *Encyrtus anceus*. It differs from *flagellare* in having the antennal pedicellus longer (about 3.5 times as long as broad in profile); the funicle segments longer, the first being 4—4.5 times as long as broad and as long or slightly longer than the pedicellus, the sixth nearly twice as long as broad. The head of *anceus* appears rather less transverse (in dorsal view), and the posterior ocelli are rather nearer to the margin of the eye. In view of these differences, I think it is best to regard *anceus* as distinct from *flagellare*.

Copidosoma filicornе (Dalman).

Encyrtus filicornis Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 351.

Transferred to *Copidosoma* Ratzeburg by Mayr (1875, pp. 734, 737). Placed by Thomson (1875, p. 180) in *Litomastix*. There is now general agreement that *filicornis* Dalman belongs to *Copidosoma* s. str.

Dalman's collection contains one female specimen standing as *filicornis*; this bears a label upon which what appears to be the number "58" is written. The specimen agrees well enough with the description except that the fore and mid coxae, and the fore femur, are dark-marked. Dalman (1820, p. 351) described the species from "Specimen unicum in Pinu lectum, in Insula Farön Gottlandiae, 14 Julii." ZETTERST. I am not quite sure whether the specimen in Dalman's collection should be regarded as the type; but I could not see any other in Zetterstedt's collection when examining it some years ago. That in Dalman's collection is therefore the only indication we have of the identity of *filicornis*. It agrees with Thomson's (1875) interpretation.

Walker (1846, p. 56) listed his species *Encyrtus Didius* (1837, Ent. Mag., 4, p. 452) as a synonym of *filicornis*, and I have reasons for believing that he saw some of Dalman's material of *Encyrtus*. Walker described *didius* from English specimens, in the British Museum there are two Walker specimens (female) now placed under the name *filicornis* Dalman, and both of which probably represent part of his original material of *didius*. One is actually labelled "Didius" in Walker's handwriting. Two other females, both certainly Walker specimens, and labelled as *didius*, exist in the Dale collection (Oxford) and the Haliday collection (Dublin). I regard all these specimens from the British collections as being identical with the female in Dalman's collection (there are slight differences in the strength of the sculpture of the scutellum in some of them, but I think this is within the range of variation of one species). It therefore looks as though *Encyrtus didius* Walker is really the same as *filicornis* Dalman.

Litomastix chalconotus (Dalman)

Encyrtus chalconotus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 169.

Transferred by Mayr (1875, pp. 734, 735, 739) to *Copidosoma*. Thomson (1875, p. 173) placed it in *Litomastix*, and it is generally agreed that this is its correct position, which examination of the types confirms.

Dalman's collection contains two females standing as *chalconotus*. They are conspecific, but I choose as lectotype the specimen bearing two labels upon which are written the figures "8." and "19.", respectively. Thomson's (1875, p. 173) redescription and specimens agree with the lectotype.

Walker (1837 p. 35) described a species *Encyrtus Mitreus*, which he later (1846, p. 56) placed in synonymy with *chalconotus*. I regard this synonymy as correct. In the British Museum there is a Walker specimen, labelled "Mitreus" in Walker's handwriting, and this is a male *chalconotus*. The Haliday collection (Dublin) also contains a Walker specimen labelled "mitreus", and this is a female of *chalconotus*.

Mayr (1875) evidently did not know the male of *chalconotus*, as he assumes that it has antennae differing markedly from those of the female (as shown by his making *Encyrtus serricornis* Dalman a synonym of *chalconotus*, a conclusion which is incorrect: see below). The true male of *chalconotus* has antennae which resemble those of the female in having an obliquely truncate (although smaller) clava, as described by Thomson (1875, p. 173).

Litomastix serricornis (Dalman)

Encyrtus serricornis Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 360.

Encyrtus Phithra Walker, 1837, *Ent. Mag.*, 5, p. 36, syn. n.

Copidosoma cidariae Mayr, 1875, *Die europäischen Encyrtiden*, pp. 734, 738, syn. n.

Mayr (1875, p. 739) made this a synonym of *Copidosoma chalconotum* (Dalman). However, Thomson (1875, p. 178) regarded it as a distinct species. Examination of the type shows that Thomson's view is the correct one.

In Dalman's collection a single specimen, a male, stands as *serricornis*. It agrees very well with the description, and I designate it as lectotype. In spite of having the antennal flagellum subfiliform and clothed with relatively long hairs, with the clava oblong and not obliquely truncate at the apex, it belongs to the same species-group as *chalconotus*, and is certainly the hitherto unrecognized male of *Litomastix cidariae* Mayr, which thus becomes a synonym. I have examined the types of both *phithra* Walker and *cidariae* Mayr.

Litomastix truncatellus (Dalman)

Encyrtus truncatellus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 168.

Dalman's collection contains two specimens, a male and a female. I consider that the female best fits the description, and *Entomol. Ts. Årg. 79. H. 3-4, 1958*

designate it as lectotype; it bears a small yellowish label on which is written "IG".

The lectotype will not run correctly in the keys to *Litomastix* given by Mercet (1921, p. 443) and Nikol'skaya (1952, p. 412), because the antennal clava is only about as long as the combined length of the four preceding funicle segments (not nearly as long as the whole funicle, as Mercet says). It would, however, run in Mercet's key to *aestivalis* Mercet, and agrees pretty well with his description of that species. In Mercet's collection (Madrid) there is a female from Cercedilla (labelled as *aestivalis*) which agrees with his description; it is conspecific with the lectotype of *truncatellus* Dalman. Therefore it seems probable that *aestivalis* Mercet is a synonym of *truncatellus*. Mercet's supposed *truncatellus* (1921, p. 456) is certainly another and quite distinct species (probably near *auricollis* Thomson).

Trichomasthus cyaneus (Dalman)

Encyrtus cyaneus Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*,
p. 160.

Transferred by Thomson (1875, p. 143) to *Trichomasthus*, and designated by Gahan and Fagan (1923, p. 148) as the type species of that genus.

Dalman's collection contains two syntypes of *cyaneus*, both female. I designate as lectotype the specimen bearing a small gold lozenge-shaped ticket, and also a label with the number "6". The other specimen, bearing a label with the number "55.", agrees with Dalman's description of his var. β .

The lectotype has a very broad fronto-vertex (breadth at its narrowest point relative to the breadth of an eye as seen from above as 22:25), and the ocelli stand in a nearly right-angled triangle. Mayr (1875, p. 718) remarked "Beim Dalman'schen Weibchen bilden die Ocellen ein stumpfwinkliges Dreieck, was bei dieser Art eine abnorme Bildung ist." In the second specimen (var. β) the fronto-vertex is much narrower. The breadth of the fronto-vertex, disposition of the ocelli, and the number of rows of larger punctures on the fronto-vertex, have been used as specific characters in *Trichomasthus*. Recently Alam (1957, p. 447) has described a new species, *frontalis*, which is said to differ from *cyaneus* in having a narrower fronto-vertex with fewer rows of punctures, and in the colour of body and the legs, amongst other characters. Some time ago I made a preliminary study of the same characters (and some others), from which I concluded that there may be great variation of a kind which makes it very difficult to

segregate a number of specimens into sharply-defined forms or species. For instance, there seem to be intergrades (as shown by measurements) between forms with a broad and those with a narrow fronto-vertex. I think the whole question of speciation within *Trichomasthus* requires very careful study, with the aid of bred series, before we can be sure how many species are involved.

Amongst Walker's species, the following belong to the genus *Trichomasthus*:

Encyrtus Marsus Walker, 1837, *Ent. Mag.*, 4, p. 444 (♀).

Encyrtus Matthinus Walker, 1837, *ibid.*, p. 455 (♂).

Encyrtus Genutius Walker, 1846, *Ann. Mag., nat. Hist.*, 17, p. 180 (♀).

Encyrtus Stigma Walker, 1847, *Ann. Mag. nat. Hist.*, 19, p. 228 (♀).

Some of these may be good species. *T. stigma* (Walker), of which the probable type is in the Hope Department (Oxford) is more distinct than the others, and much resembles *cyanifrons* (Dalman). From the single specimen of *cyanifrons* in Dalman's collection (a female without data, which I take as lectotype), it differs in having the fronto-vertex broader, the ocelli in a less acute-angled triangle, the antennal scape less slender, the funicle segments a little shorter, and the clava slightly longer. In these respects it seems to agree with *coeruleus* Mercet, 1923 (= *cyanifrons* Mercet, 1921, nec Dalman, 1820).

Aphyucus apicalis (Dalman)

Encyrtus apicalis Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 153.

Transferred by Mayr (1875, p. 695) to his genus *Aphyucus*, and designated as type species of that genus by Ashmead (1900, p. 313).

As a number of species of *Aphyucus* are now known, it appeared worth while to re-examine the holotype of *apicalis* in Dalman's collection. The species was described with the remarks "Hab. in Smolandia; a Dom. BOGEMAN mihi benevole communicatus. Non nisi unicum exemplar vidi." The only specimen in Dalman's collection bears two labels reading "Smolandia Bogeman." and "10." respectively, and is certainly the holotype.

Hoffer (1954, pp. 83—94, figs. 1—5) has given a very useful revision of the European *Aphyucus*. The holotype of *apicalis* runs in Hoffer's key (p. 84) to couplet 4 and to *apicalis*. It also agrees quite well with Hoffer's redescription of the female (pp. 89—90) except in colour (it is a darker specimen). The following supplementary notes made from the holotype may be useful:

Head with a slight dusky band on the vertex across the posterior
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ocelli; gena at lower corner of eye slightly dusky; occipital surface mainly fuscous. Mesoscutum (except fairly broadly at the sides), and scutellum, fuscous. Prosternum slightly dusky. The legs are pale greyish-yellow, with the hind coxa dusky at the base, and all the tibiae greyish except narrowly at the base and broadly at the apex.

Breadth of fronto-vertex relative to breadth of an eye (as seen from above) as 13.5 to 16. Posterior ocelli each about half their longer diameter from eye-margin, about their longer diameter from occipital edge. The antennal flagellum appears broader than in Hoffer's figure 3 (especially the clava, which is almost truncate), but this may be partly due to the fact that it is rather shrunken and flattened in the holotype.

I should draw attention here to the fact that *Encyrtus hederaceus* Westwood (1837, *Phil. Mag.*, 10, p. 441) which has been placed in *Euaphycus* by Mercet (1921, p. 198, 200, 203) and in *Metaphycus* by other authors, is in reality a species of *Aphycus* s. str., and closely related to *apicalis* (Dalman). I designate as lectotype of *hederaceus* a female in Westwood's collection bearing two labels reading "Ivy. Chiswick July 34" and "Hederaceus W^d." in Westwood's handwriting. Westwood's description is poor, but the lectotype agrees well enough and has the correct data. *A. hederaceus* closely resembles the holotype of *apicalis* in colour; in structure it differs in having the antennal funicle and clava less clavate, the funicle segments slightly less transverse (the antenna much resembling Hoffer's figure 2 of *fulvohirtus*), the spur of the mid tibia slightly shorter and the corresponding metatarsus slightly more slender, and the ovipositor (exserted part) slightly less than one-third of the length of the gaster. I have seen other specimens which agree with Westwood's type in these respects, and feel sure that *hederaceus* must be a distinct species. In Hoffer's key (p. 84) it would run to couplet 3, but not agree with the description of *atratulus* Hoffer because it has a more extensively pale head, thorax, and legs.

Prionomastix morio (Dalman)

Encyrtus morio Dalman, 1820, *K. svenska Vetensk. Akad. Handl.*, p. 164.

Dalman described *morio* from a single male taken in Sweden, since when the species has rarely been found. Redescriptions of the male were also given by Mayr (1875), Thomson (1875), and Mercet (1921). Hellén (1949, p. 43), however, concluded that these authors had mistaken the sex, and that the form described was really female. Hoffer (1957, pp. 199—202) has discussed the question

ably and in great detail, and shows that Hellén's view is mistaken. I wish to add only that I have myself seen the holotype of *morio*, and that it is undoubtedly a male. It bears a small gold lozenge-shaped ticket (probably indicating Väster Götland, the type-locality).

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